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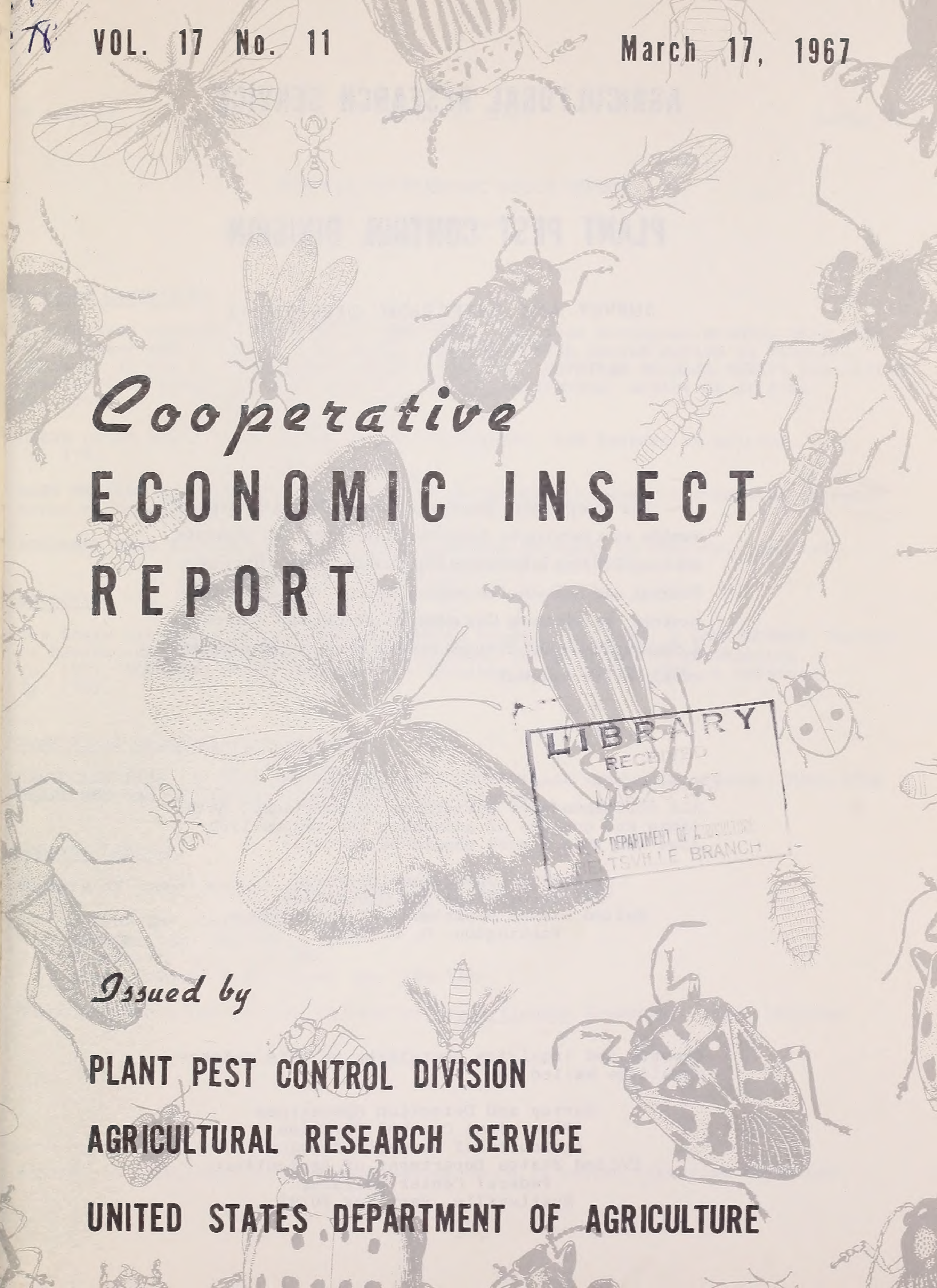

Cooperative
ECONOMIC INSECT REPORT

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PLANT PEST CONTROL DIVISION
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SURVEY AND DETECTION OPERATIONS

The Cooperative Economic Insect Report is issued weekly as a service to American Agriculture. Its contents are compiled from information supplied by cooperating State, Federal, and industrial entomologists and other agricultural workers. In releasing this material the Division serves as a clearing house and does not assume responsibility for accuracy of the material.

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Volume 17 March 17, 1967 Number 11

COOPERATIVE ECONOMIC INSECT REPORT

HIGHLIGHTS

Current Conditions

High winter survival of EUROPEAN CORN BORER indicates potential problem this year in Delaware and Illinois. (p. 173). ALFALFA WEEVIL larvae active in Virginia, Indiana, Illinois, Mississippi, and California. EGYPTIAN ALFALFA WEEVIL population heavier than normal for this time of year in California; active in Arizona. (p. 174).

GREEN PEACH APHID damaging sugarbeets, safflower, and lettuce in Arizona. (p. 175).

BARK BEETLES infesting National Forests in California; several potential epidemic areas reported. (p. 177).

NORTHERN FOWL MITE severly infested commercial hatchery in Florida. (p. 178).

Detection

New State records include a SOD WEBWORM in Kansas, (p. 173); a LONG-HORNED BEETLE in Nevada, an ERIOPHYID MITE in Pennsylvania, and a LOUSE FLY in Oklahoma, (p. 177); SOUTHERN POTATO WIREWORM in Virginia and a PLUME MOTH in Delaware, (p. 179).

Some First Occurrences of Season

NANTUCKET PINE TIP MOTH and EASTERN TENT CATERPILLAR larvae in Alabama; TARNISHED PLANT BUG and CONVERGENT LADY BEETLE in Arkansas.

Special Reports

Summary of Insect Conditions in the United States - 1966

- Cotton (pp. 181-183).
- Tobacco (pp. 183-184).
- Sugarbeets (pp. 184-185).
- Miscellaneous Field Crops (pp. 185-186).

Notes on, and a Key to, the Species of *Neophyllaphis* Takahashi. (pp. 187-194).

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WEATHER OF THE WEEK ENDING MARCH 13

HIGHLIGHTS: Springlike weather brought tornadoes to Dixie and flooding to the Ohio River Valley and parts of the Northeast.

PRECIPITATION: An outbreak of tornadoes and heavy thunderstorms brought death and destruction to the Deep South early in the week. Precipitation totals ranged 1-4 inches over parts of Arkansas, the Ohio River Valley, and the Appalachians. Heavy rains also fell Friday from northern Alabama to South Carolina. On Sunday, hail as large as baseballs pounded some spots northwest of Evansville, Indiana, and heavy rains caused flooding along some tributaries and the main stem of the Ohio River. The generous rains also flooded many areas in the Northeast from West Virginia to New Jersey. The drought continued in parts of the western Plains and the Great Basin. In the Pacific Northwest, a storm brought moderate to heavy rains from Tatoosh Island to San Francisco with snow in the foothills and mountains early in the week. Later the precipitation spread to the southern California coast, the interior valleys of California and in the north, to the Rockies and western Plains. Weather continued on page 186.

SPECIAL INSECTS OF REGIONAL SIGNIFICANCE

GREENBUG (*Schizaphis graminum*) - KANSAS - Light to moderate on wheat in Stevens County; caused some light damage. (Simpson). OKLAHOMA - Ranged 200-300 per linear foot on wheat in Oklahoma County and up to 200 per linear foot in scattered fields in Jackson County. Ranged 15-50 per linear foot in Greer, Cotton, and Tillman Counties. Reported heavy in Washita, Grady, and Garvin Counties; moderate in Caddo, Kingfisher, and Garfield Counties; light in Blaine County. Weather may have been severe enough during week to reduce populations in some areas. (Okla. Coop. Sur.). ARKANSAS - Increasing slightly but still low in northwest area. (Ark. Ins. Sur.).

SPOTTED ALFALFA APHID (*Therioaphis maculata*) - OKLAHOMA - Heavy in Greer County alfalfa, with some young stands seriously damaged; moderate in Garvin County. (Okla. Coop. Sur.). UTAH - Few found in Hurricane area of Washington County. (Knowlton). MISSISSIPPI - Very light in Pontotoc County. (Dinkins). ARKANSAS - Remains low in northwest area. (Ark. Ins. Sur.).

CORN LEAF APHID (*Rhopalosiphum maidis*) - ARIZONA - Increased on barley in Yuma, Maricopa, and Pinal Counties. Averaged 700 per 100 sweeps. (Ariz. Coop. Sur.).

SIX-SPOTTED LEAFHOPPER (*Macrosteles fascifrons*) - MISSISSIPPI - Light on small grains in Oktibbeha County. (Dinkins).

ARMY CUTWORM (*Chorizagrotis auxiliaris*) - KANSAS - Ranged 1-14 per square foot on wheat in Cowley, Chase, Butler, and Barber Counties. Damage sufficient in Cowley County to warrant controls. (Simpson).

CORN, SORGHUM, SUGARCANE

EUROPEAN CORN BORER (*Ostrinia nubilalis*) - DELAWARE - Spring survey showed average of 205 live borers per 100 cornstalks. Based on fall population of 307 borers per 100 stalks, winter survival was estimated at 67 percent. This survival indicates a potentially high borer population for the coming season. (Burbutis). ILLINOIS - Percent winter survival of borers 83 in McLean County, 80 in Henderson County. Borer survival apparently above normal; 7-year average is 74 percent. (Ill. Ins. Rpt.).

SMALL GRAINS

BROWN WHEAT MITE (*Petrobia latens*) - OKLAHOMA - Counts per linear foot on wheat ranged 300-1,500 in Greer and Tillman Counties, up to 500 in Oklahoma County. Counts of 50-400 per linear foot common in Cotton, Jackson, Grady, Dewey, and Woodward Counties. Reported heavy in Washita County; moderate in Garfield, Kingfisher, and Blaine Counties; light in Caddo County. (Okla. Coop. Sur.).

WINTER GRAIN MITE (*Penthaleus major*) - KANSAS - Very light on wheat in few south-central district fields. (Simpson).

GREAT BASIN WIREWORM (*Ctenicera pruinina*) - WASHINGTON - Probably this species, damaging winter wheat in Pullman area, Whitman County. (Telford).

A LEAFHOPPER (*Graminella nigrifrons*) - MISSISSIPPI - Light on small grains in Oktibbeha County. (Dinkins).

TURF, PASTURES, RANGELAND

A SOD WEBWORM (*Surattha indentella*) - KANSAS - Damaged buffalo grass during 1966 in Pawnee, Stafford, Rice, Meade, and Wichita Counties. This is a new State record. Det. by A. B. Klots and R. W. Hodges. (Thompson).

FORAGE LEGUMES

ALFALFA WEEVIL (Hypera postica) - CALIFORNIA - Active in Fresno, Fresno County; this may indicate a season of heavy damage. Alfalfa weevil is seldom found as far south as Fresno County. (Cal. Coop. Rpt.). MISSISSIPPI - Larvae averaged 4 per square foot on flame-treated alfalfa and 27 per square foot on untreated alfalfa in Pontotoc County. (Dinkins). MISSOURI - No live larvae found in 5 fields checked in southeast area after 4-11 inches of snow. (Munson). ILLINOIS - Larvae ranged 10-40 per square foot in Massac, Pope, and Hardin Counties. Counts comparable to last week inspite of several cold days. Adults and eggs present; majority of eggs in dried stems. (Ill. Ins. Rpt.). INDIANA - During late February, 200 eggs per square foot were present in northeastern Dubois County; first-instar larvae were inside alfalfa stems in Vincennes area, Knox County, and first through third instars were on 1-2 inch alfalfa in Ohio River floodplain areas of Perry, Spencer, and Harrison Counties. (Mathew). VIRGINIA - Mostly second-instar larvae active on alfalfa at Chesterfield Court House, Chesterfield County, and at Mechanicsville, Henrico County. (Innes, Mar. 3).

EGYPTIAN ALFALFA WEEVIL (Hypera brunneipennis) - ARIZONA - Decreased in Yuma County, but continued to increase in Maricopa County. Terminal damage 40-90 percent in infested fields. (Ariz. Coop. Sur.). CALIFORNIA - Very light populations active on alfalfa at Lancaster, Los Angeles County; single specimen was taken in Lancaster area last year. In Pomona and La Puente areas of Los Angeles County, populations are heavier than ever observed at this time of year. (Cal. Coop. Rpt.).

CLOVER LEAF WEEVIL (Hypera punctata) - ARKANSAS - Larval counts very low on legumes in northwest area. (Ark. Ins. Sur.).

SPOTTED CUCUMBER BEETLE (Diabrotica undecimpunctata howardi) - ALABAMA - Adults began emerging and feeding on leaves of crimson clover in southern section. (McQueen).

GREEN CLOVERWORM (Plathypena scabra) - ALABAMA - Larvae 1-3 per sweep on crimson clover in Mobile and Baldwin Counties; mostly first instar. (McQueen).

PEA APHID (Acrythosiphon pisum) - WASHINGTON - Mostly first and second instars on seed and forage alfalfa; 25 per sweep in Gardena Beach area and 7 per sweep in Pasco area. (Telford, Feb. 24). OREGON - All stages present and active on alfalfa in Umapine area of Umatilla County; averaged 2.5 per tip or 90 per sweep in stands 2-6 inches high. If good weather continues, control operations will soon be necessary. (Halfhill). OKLAHOMA - Heavy on alfalfa in Greer County; light in Washita County. (Okla. Coop. Sur.). ARKANSAS - Counts high on alfalfa in extreme southwest area. Very little change noted in northwest area. (Barnes).

AN APHID (Macrosiphum creelii) - WASHINGTON - Adults and nymphs, probably this species, 12 per sweep on 20 percent of seed and forage alfalfa in Walla Walla area, Walla Walla County. (Halfhill, Feb. 24).

TARNISHED PLANT BUG (Lygus lineolaris) - ALABAMA - Numerous adults feeding on crimson clover in southern section. (McQueen). ARKANSAS - First activity of season observed on vetch in northwest area. (Ark. Ins. Sur.).

A LEAFHOPPER (Aceratagallia uhleri) - KANSAS - Moderate, 25-30 per square foot, on established alfalfa in Butler and Chase Counties. Det. by H. D. Blocker. (Simpson).

TOBACCO

GREEN PEACH APHID (Myzus persicae) - FLORIDA - Few nymphs and adults scattered on approximately 2 percent of tobacco at Loughman, Polk County. (Skipper et al., Mar. 3).

SUGARBEETS

GREEN PEACH APHID (*Myzus persicae*) - ARIZONA - Controls necessary to protect young sugarbeets in Maricopa County. (Ariz. Coop. Sur.).

MISCELLANEOUS FIELD CROPS

GREEN PEACH APHID (*Myzus persicae*) - ARIZONA - Heavy on safflower in Yuma and Maricopa Counties; retarded growth in 10 percent of infested fields. (Ariz. Coop. Sur.).

LYGUS BUGS (*Lygus* spp.) - ARIZONA - Nymphs continue to increase on safflower in Maricopa and Pinal Counties; averaged 250 per 100 sweeps. (Ariz. Coop. Sur.).

COLE CROPS

IMPORTED CABBAGEWORM (*Pieris rapae*) - ALABAMA - Adults abundant in home gardens and commercial plantings of cabbage and collards in Baldwin, Mobile, and other southern counties. Adults light as far north as Montgomery and Lee Counties. Egg laying general and few larvae observed in Baldwin County. (McQueen).

DIAMONDBACK MOTH (*Plutella xylostella*) - ALABAMA - Larvae light to medium in commercial planting of mature cabbage in Baldwin County. (McQueen).

GENERAL VEGETABLES

GREEN PEACH APHID (*Myzus persicae*) - ARIZONA - Controls necessary to protect young lettuce in Yuma and Maricopa Counties. (Ariz. Coop. Sur.).

CABBAGE LOOPER (*Trichoplusia ni*) - ARIZONA - Light on lettuce in Yuma County. Some controls applied. (Ariz. Coop. Sur.).

THRIPS - NEW MEXICO - Undetermined species averaged 1-10 per onion plant near Mesilla, Dona Ana County. (Elson).

DECIDUOUS FRUITS AND NUTS

HICKORY SHUCKWORM (*Laspeyresia caryana*) - ALABAMA - Larval survival high in pecan shucks on ground in Lee, Montgomery, and Dallas Counties. Pupation occurring as far north as Lee County. (Leeper et al.).

WALNUT HUSK FLY (*Rhagoletis completa*) - CALIFORNIA - A single male taken from an oriental fruit fly trap baited with methyl eugenol in Fullerton, Orange County. Husk flies emerged during recent warm weather and normally are not attracted to traps baited with methyl eugenol. (Cal. Coop. Rpt.).

ARMORED SCALES - ALABAMA - *Pseudaulacaspis pentagona* was heavy on peach and plum in older home orchards throughout central and southern sections where little or no controls have been applied. *Chrysomphalus obscurus* was heavy on lower limbs of older pecan trees in Baldwin County. (McQueen). NEW MEXICO - *Aspidiotus perniciosus* heavy on backyard apple plantings in Farmington area, San Juan County. (Heninger). CALIFORNIA - *Lepidosaphes ficus* light in 10 acres of walnuts at Sanger, Fresno County. (Cal. Coop. Rpt.).

CITRUS

AN ARMORED SCALE (*Unaspis citri*) - FLORIDA - Infested one of 25 sweet orange plants in nursery at Gainesville, Alachua County, February 27. This is a new county record. (Graham). Previous records of *U. citri* on other hosts in Alachua County are probably in error. (Denmark).

HEMISPHERICAL SCALE (*Saissetia coffeae*) - CALIFORNIA - Heavy on backyard citrus in Ventura, Ventura County. (Cal. Coop. Rpt.).

CITRUS THRIPS (*Scirtothrips citri*) - ARIZONA - Economic numbers appearing in some citrus areas of Yuma and Maricopa Counties. (Ariz. Coop. Sur.).

SPIREA APHID (*Aphis spiraecola*) - FLORIDA - All stages infesting 1 percent of 5,000 sweet orange plants at Oak Hill, Volusia County. (Pott, Mar. 3).

SMALL FRUITS

TWO-SPOTTED SPIDER MITE (*Tetranychus urticae*) - FLORIDA - Adults damaged strawberries at East Wauchula, Hardee County. (Rhodes, Mar. 1).

ORNAMENTALS

AZALEA LEAF MINER (*Gracillaria azaleella*) - CALIFORNIA - Larvae medium on azalea nursery stock in Vista, San Diego County. (Cal. Coop. Rpt.).

AN OLETHREUTID MOTH (*Laspeyresia cupressana*) - CALIFORNIA - Larvae heavily damaged twigs of Italian cypress in San Jose, Santa Clara County. (Cal. Coop. Rpt.).

OMNIVOROUS LOOPER (*Sabulodes caberata*) - CALIFORNIA - Larvae medium on fatshedera plants in Santa Maria, Santa Barbara County. This pest was more widespread and occurred on a wider range of hosts than usual during 1966. (Cal. Coop. Rpt.).

ALFALFA LOOPER (*Autographa californica*) - CALIFORNIA - First-instar larvae light on juniper nursery stock in Azusa, Los Angeles County; adults collected from light trap in La Grange, Stanislaus County. This is unusually early and may indicate problem this season. (Cal. Coop. Rpt.).

MEALYBUGS - CALIFORNIA - *Pseudococcus adonidum* and *P. obscurus* heavy on New Zealand flax nursery stock in Oakland, Alameda County. *P. longispinus* medium on New Zealand flax in Tiburon and Mill Valley, Marin County. (Cal. Coop. Rpt.).

BROWN SOFT SCALE (*Coccus hesperidum*) - CALIFORNIA - This and *Hemiberlesia lataniae* heavy on *Bromelia* sp. nursery stock in Spring Valley, San Diego County. (Cal. Coop. Rpt.).

AN ARMORED SCALE (*Temnaspidiotus excisus*) - FLORIDA - All stages severe on 500 *Aglaonema commutatum* plants at nursery in Apopka, Orange County. (Musgrove, Jan. 31).

A CONIFER APHID (*Cinara tujafilina*) - NEW MEXICO - Moderate to heavy on arborvitae at Hobbs, Lea County. (Mathews).

BOXWOOD LEAF MINER (*Monarthropalpus buxi*) - VIRGINIA - Heavy on boxwoods at Chatham, Pittsylvania County. (Isakson, Blair).

FOREST AND SHADE TREES

BARK BEETLES - CALIFORNIA - Dendroctonus brevicomis, D. valens, and Ips spp. infested 500-acre stand of sugar pine and ponderosa pine in the Daller Spring area, Tahoe National Forest; some trees killed. (Rich, U.S.F.S.). D. brevicomis and Ips sp. occurred in recently logged ponderosa and sugar pine stands. Insects killed all size trees in groups in the Porter Crossing, Peavine, Low Gap, and Anderson Ridge areas in the Mendocino National Forest. These locations are near the Kelly Cabin epidemic area of 1966. Portion of area now inaccessible; control will depend on access this spring. (Thompson et al., U.S.F.S.). Several potential epidemic areas of D. brevicomis and Ips sp. indicated in the Sierra National Forest. Fades observed in several areas. (Young et al., U.S.F.S.).

EASTERN LARCH BEETLE (Dendroctonus simplex) - WISCONSIN - Adults numerous in grove of native tamarack in Walworth County. Emergence had not begun by mid-February, but birds were feeding on insects in galleries. Water table recently altered in area by fill-in operations. (Wis. Ins. Sur.).

A WEEVIL (Cylindrocopturus eatoni) - CALIFORNIA - Severely infested ponderosa pine plantation in Scott Ridge area, Stanislaus National Forest. Entire plantation affected; up to 200 trees infested per acre. This is the first report of a large infestation in several years. (U.S.F.S.).

NANTUCKET PINE TIP MOTH (Rhyacionia frustrana) - ALABAMA - First adult emergence of season occurred in pine tree tips in Mobile and Baldwin Counties. Few adults emerged as far north as Dallas County. (McQueen).

A PINE TUSSOCK MOTH (Halisodota ingens) - COLORADO - Third-instar larvae abundant and feeding on pine near Elbert, Elbert County. (Olkjer).

A LONG-HORNED BEETLE (Neoclytus caprea) - NEVADA - Larvae and adults medium on ash in Las Vegas, Clark County, in January. New State record. (Bechtel, Zoller, Mar. 3).

EASTERN TENT CATERPILLAR (Malacosoma americanum) - FLORIDA - Middle to late-instar larvae infesting wild cherry and wild plum in Alachua and Putnam Counties. Recent cold weather had little or no effect on pest or hosts. (Hetrick). ALABAMA - First larvae of season observed on wild cherry in Dallas and Coffee Counties. (McQueen).

A COREID BUG (Leptocoris rubrolineatus) - NEVADA - Adults active on boxelder and maple in Reno, Washoe County. (Ting, Mar. 3).

AN ERIOPHYID MITE (Phyllocoptes wisconsinensis) - PENNSYLVANIA - Heavy in 0.5 acre of commercial elderberry at Mercer, Mercer County, September 22, 1966. Det. by H. H. Keiffer. This is a new State record. (Adams).

MAN AND ANIMALS

MOSQUITOES - LOUISIANA - Larval collections in Jefferson Parish during week ending March 3 contained Aedes vexans, Anopheles quadrimaculatus, Culex restuans, Culex salinarius, and Culiseta inornata. Adult activity low throughout parish except in Cheniere Camanada area near Grand Isle where Anopheles atropos and Culex salinarius averaged 32.8 per night. Mosquitoes averaged 3.8 per night in 20 light traps operated in remainder of parish. (Stokes).

CATTLE LICE - ALABAMA - Bovicola bovis and Haematopinus eurysternus heavy on beef cattle in Bibb County. Several herds treated. (Odom). OKLAHOMA - Mostly H. eurysternus heavy on cattle in Garvin County, moderate in Marshall and Mayes Counties. (Okla. Coop. Sur.). IOWA - H. eurysternus and B. bovis adults light, less than 5 per head, on 8 cattle from 8 farms in Polk, Dallas, and Boone Counties. (Iowa Ins. Sur.). UTAH - Cattle lice moderate to severe on some untreated beef herds in Beaver and Millard Counties. (Knowlton).

HORN FLY (Haematobia irritans) - ALABAMA - Adults occurring 1-2 weeks earlier than normal on cattle at Camp Hill, Tallapoosa County. (Bourne et al.). MISSISSIPPI - Approximately 2 flies per animal observed on cattle in Oktibbeha County. (Dinkins). OKLAHOMA - Light, 3-4 per head, on cattle in Payne County during recent warm days. (Okla. Coop. Sur.).

COMMON CATTLE GRUB (Hypoderma lineatum) - OKLAHOMA - Ranged 1-12 per head in cattle in Marshall County and 3-5 per head in Garvin County. Moderate in Mayes and Cleveland Counties. (Okla. Coop. Sur.).

SCREW-WORM (Cochliomyia hominivorax) - No cases reported in U. S. March 5-11. Total of 57 cases reported in portion of Barrier Zone in Republic of Mexico February 26-March 4 as follows: Baja California 1, Territorio sur de Baja California 20, Sonora 26, Chihuahua 4, Nuevo Leon 2, Tamaulipas 4. No cases reported from Mexico south of Barrier Zone. Barrier Zone is area where eradication operations are underway to prevent establishment of self-sustaining population in U. S. Sterile screw-worm flies released March 5-11: Texas 10,968,000, Mexico 96,432,000. (Anim. Health Div.).

SHEEP KED (Melophagus ovinus) - IOWA - Adults and eggs very heavy, 50 per 25 partings, on two sheep from Polk County. (Iowa Ins. Sur.).

A LOUSE FLY (Lipoptena mazamae) - Collected from white-tailed deer in eastern section. Det. by A. Stone. This is new State record. (Okla. Coop. Sur.).

NORTHERN FOWL MITE (Ornithonyssus sylviarum) - MISSISSIPPI - Moderate on caged laying hens in Oktibbeha County. (Dinkins). FLORIDA - Severe in breeding flock of 30,000 chickens at commercial hatchery in Callahan, Nassau County. Several hens dead, others dying in several of the hen houses. Improper application of recommended chemical allowed mites to build up. (Strayer).

STORED PRODUCTS

A VINEGAR FLY (Drosophila sp.) - PENNSYLVANIA - This and Diastata sp. emerging from potatoes at a chip factory in Columbia County; operators concerned about contamination of potato chips. (Menusan).

BENEFICIAL INSECTS

CONVERGENT LADY BEETLE (Hippodamia convergens) - ALABAMA - Early emerged adults feeding on aphids in pine trees in central and southern sections. (McQueen). ARKANSAS - First activity of season noted March 10 on pea aphid infested vetch in northwest area. (Ark. Ins. Sur.).

A LADY BEETLE (Coleomegilla maculata fuscilabris) - ALABAMA - Feeding on aphids in pines in Baldwin and Escambia Counties. (McQueen).

A BIG-EYED BUG (Geocoris punctipes) - ALABAMA - Adults active on crimson clover in extreme southern section. (McQueen).

FLOWER BUGS (Orius spp.) - ALABAMA - Adults numerous on crimson clover in extreme southern part of State. (McQueen).

DAMSEL BUGS (Nabis spp.) - ARKANSAS - Active in northwest area. (Ark. Ins. Sur.).

FEDERAL & STATE PLANT PROTECTION PROGRAMS

GRASSHOPPERS - OKLAHOMA - Results of egg pod survey by county: Cherokee - 4 stops, 3 pods; Muskogee - 3 stops, 1 pod; Craig - 4 stops, no pods; Delaware - 6 stops, 3 pods; Mayes - 6 stops, 4 pods; Nowata - 4 stops, 1 pod. Egg pods averaged

0-0.75 per square foot. (Okla. Coop. Sur.). COLORADO - *Chortophaga viridifasciata* nymphs active on warm days of February at Fort Collins, Larimer County. (Wellso).

IMPORTED FIRE ANT (*Solenopsis saevissima*) - FLORIDA - Adults collected in De Soto County for new county record. Det. by H. A. Denmark. (Lamb, Mar. 3).

TULIPTREE SCALE (*Toumeyella liriodendri*) - CALIFORNIA - Survey completed in San Jose treatment area; none found on 189 yard hosts and 27 parkway trees in treatment area. Heavy infestation found on single tree in border block adjacent to infested area. (Cal. Coop. Rpt.).

INSECT DETECTION

New State Records

A LONG-HORNED BEETLE (*Neoclytus caprea*) - NEVADA - Collected on ash in Las Vegas, Clark County, in January. (p. 177).

SOUTHERN POTATO WIREWORM (*Conoderus falli*) - VIRGINIA - Two adults collected in light trap at Norfolk, July 15, 1966. (PPC).

A SOD WEBWORM (*Surattha indentella*) - KANSAS - Damaged buffalo grass during 1966. Det. by A. B. Klots and R. W. Hodges. (p. 173).

A PLUME MOTH (*Oidaematophorus monodactylus*) - DELAWARE - Adult collected at light by J. Franklin at Dover, Kent County, on November 16, 1965. Det by R. W. Hodges. (Burbutis).

A LOUSE FLY (*Lipoptena mazamae*) - OKLAHOMA - Collected from white-tailed deer. Det. by A. Stone. (p. 177).

AN ERIOPHYID MITE (*Phylocoptes wisconsinensis*) - PENNSYLVANIA - Collected on commercial elderberry at Mercer, Mercer County, September 22, 1966. Det. by H. H. Keiffer. (p. 177).

New County Records

ORIENTAL WOOD BORER (*Heterobostrychus aequalis*) - FLORIDA - Larvae and adults collected from white oak lumber at Miami, Dade County, February 23. Reported in CEIR 17(10):156.

IMPORTED FIRE ANT (*Solenopsis saevissima*) - FLORIDA - Collected in De Soto County. Det. by H. A. Denmark. (p. 179).

AN ERIOCOCCID SCALE (*Dactylopius confusus*) - FLORIDA - Specimens collected on stem of pricklypear at Cross City, Dixie County. (Graham, Feb. 15).

AN ARMORED SCALE (*Unaspis citri*) - FLORIDA - Collected at Gainesville, Alachua County, February 27. (p. 176).

CORRECTIONS

CEIR 17(10):158 - Beneficial Insects - AN ICHNEUMONID WASP (Ecthromorpha fuscator) should read AN ICHNEUMON WASP (Ec*h*thromorpha *agrestoria* fuscator).

HAWAII INSECT REPORT

Vegetables - ONION THRIPS (*Thrips tabaci*) medium on 10 acres of bulb onions in Kihei and 2.5 acres in Pulehu, Maui. (Miyahira). IMPORTED CABBAGEWORM (*Pieris rapae*) larvae caused moderate damage on 1 acre of cauliflower in Pulehu, Maui. (Miyahira).

General Pests - BLACK TWIG BORER (*Xylosandrus compactus*) medium to heavy on mountain-apple (*Eugenia malaccensis*) and light on hau (*Hibiscus tiliaceus*), Christmas-berry (*Schinus terebinthifolius*), undetermined ginger plants and coffee plants in upper Manoa Valley, Oahu. Light on epidendrum orchids in Hilo, Hawaii Island. Mountain-apple, hau and Chirstmas-berry are new host records. (Davis et al.).

Fruits and Nuts - BROAD MITE (*Hemitarsonemus latus*) heavy and causing serious injury to macadamia flowers in scattered areas of an orchard in Hilo, Hawaii Island. Severe blossom drop may occur if left unchecked. Believed to be the first known occurrence of this mite attacking macadamia flowers in State. Population building up on young terminal leaves of passion-fruit on farm in Kahului. (Yoshioka, Ooka, Miyahira). RED-BANDED THRIPS (*Selenothrips rubrocinctus*) heavy and causing silvering of mango fruits and leaves in Waimea, Kauai. (Au). Larvae of an OLETHREUTID MOTH (*Cryptophlebia* sp.) in Hilo, Hawaii Island, light to medium on terminals of litchi, causing noticeable dieback. A SCOLYTID BEETLE (*Xyleborus fornicatus*) heavy on weakened litchi trees. (Yoshioka). RED AND BLACK FLAT MITE (*Brevipalpus phoenicis*) and CITRUS RUST MITE (*Phyllocoptruta oleivora*) heavy on grapefruit in Puhi and Lawai, Kauai; 75-95 percent of fruits heavily scarred and bronzed. (Au).

Shade Trees - CHINESE ROSE BEETLE (*Adoretus sinicus*) adults caused moderate to heavy damage to mature leaves of false kamani (*Terminalia catappa*) along roadside in entire Hana area of Maui. (Miyahira, Nakao). MONKEYPOD MOTH (*Polydesma umbricola*) larvae medium to heavy and caused heavy foliar damage to several monkeypod trees in Pearl Harbor, Oahu. (Kajiwara).

Beneficial Insects and Snails - Occasional individuals of ROSY PREDATOR SNAIL (*Euglandina rosea*) noted crossing road from Haiku to Kailua, Maui; more active in Hana. This snail purposely introduced in 1957 to prey on giant African snail (*Achatina fulica*). Populations of giant African snail remain heavy in Hana. (Miyahira, Nakao). A TACHINA FLY (*Lespesia archippivora*) reared from chrysalides of monarch butterfly (*Danaus plexippus*) collected from Manoa Valley, Oahu. Most of the chrysalides were parasitized. (Hale).

LIGHT TRAP COLLECTIONS

FLORIDA - Gainesville, 3/7, BL - Black cutworm (*Agrotis ipsilon*) 1, granulate cutworm (*Feltia subterranea*) 3, yellow-striped armyworm (*Prodenia ornithogalli*) 1, armyworm (*Pseudaletia unipuncta*) 1.

SOUTH CAROLINA - Charleston, 2/27 - 3/5, BL, temp. 24-80°, precip. 0.88 - black cutworm 4, granulate cutworm 2, armyworm 4.

TEXAS - Brownsville, 2/25-26, 3/3, 2BL, temp. 49-78°, precip. 0.88 - black cutworm 6, granulate cutworm 20, yellow-striped armyworm 3, armyworm 6, beet armyworm (*Spodoptera exigua*) 4, corn earworm (*Heliothis zea*) 5, variegated cutworm (*Peridroma saucia*) 1, cabbage looper (*Trichoplusia ni*) 3, salt-marsh caterpillar (*Estigmene acrea*)1. Waco, 3/4-10, BL - granulate cutworm 4, armyworm 1, yellow-striped armyworm 14, black cutworm 2, salt-marsh caterpillar 1.

SUMMARY OF INSECT CONDITIONS IN THE UNITED STATES - 1966

(continued from page 167)

COTTON

Highlights:

BOLL WEEVIL populations and damage were greater throughout Alabama than any year since 1962. Infestations were heavy in southern Georgia and populations increased for the third consecutive year in Arkansas. BOLLWORMS caused heavy damage in Georgia late in the season and were major pests in Alabama. Infestations declined for the third consecutive year in Arkansas. Bollworm infestations were severe in California, but the lighest in several years in Nevada. PLANT BUGS and STINK BUGS were of some concern, especially in western areas. COTTON APHID was heavier than usual in Arizona. For the first time in 6 years, COWPEA APHID was present on cotton in large enough numbers in New Mexico to warrant treatment in several fields. THRIPS were heavier on cotton than for several years in Arkansas, and approximately twice the cotton acreage was treated in Missouri than in any previous year. Thrips were of concern to cotton growers throughout Arizona, and were a seasonal problem in California.

BOLL WEEVIL (Anthonomus grandis) was heavy in southern GEORGIA where punctured squares ranged up to 30 percent by mid-June. Infestations in northern and eastern areas of the State did not reach damaging proportions until late in the season. Populations and damage were greater throughout ALABAMA than any year since 1962, and may have been the most severe of any year in northern Alabama. Weevils overwintered and emerged in large numbers, followed by a large "hatchout" in June and July. Populations increased for the third consecutive year in ARKANSAS. Boll weevil sucessfully overwintered in the extreme northwest area and was more widespread in northeastern Arkansas than in many years. Infestations in cotton were again low in MISSOURI, although infestations were economic in some fields in the extreme southern part of Dunklin County late in the season. Boll weevil was active in OKLAHOMA early in July. Populations were moderate to heavy in most areas of the State by early August and continued throughout the remainder of the season. Boll weevil was the principal concern of cotton growers in most areas of TEXAS, but there were no unusual outbreaks during 1966.

BOLLWORM (Heliothis zea) was light on cotton during early June in GEORGIA with some damage evident. Severe infestations had developed by mid-July with damage more evident. Later in the season, boll damage was heavy in some areas of Georgia. Bollworm was heavy in a large planting of cotton near Jay in Santa Rosa County, FLORDIA, during late summer. Bollworm and TOBACCO BUDWORM (H. virescens) were major pests of cotton throughout ALABAMA. Both species infested cotton in ARKANSAS, but tobacco budworm comprised only 1-6 percent of the population. This was the third consecutive year of bollworm decline in Arkansas; however, both species were serious pests of cotton, having declined from very high levels in 1963. Only 9 percent of the cotton acreage in Arkansas was treated during 1966 compared with 25 percent in 1965 and 48 percent in 1964. Bollworm and tobacco budworm built up slowly in MISSOURI during July, and continued until the first killing frost. These two pests infested 73 percent of cotton fields in the State by early September.

BOLLWORMS (Heliothis spp.) damaged cotton in OKLAHOMA from early June to mid-October. Populations were moderate to heavy in central and southwest areas of the State by early August and in the east-central area by early September. Tobacco budworm ranged up to 15 percent of the bollworm population in Oklahoma after September. Bollworm populations in cotton in TEXAS were equal to those of the past 2 years. Bollworm and tobacco budworm were locally heavy on cotton in the Rio Grande Valley, causing economic damage and concern throughout the area.

Damage was reported normal throughout the remainder of Texas. Bollworm caused only minor concern on cotton in southern NEW MEXICO. Bollworm was normal throughout the central cotton-growing area of ARIZONA during late summer, but was lighter than usual on cotton in Cochise, Graham, and Yuma Counties. Bollworm infestations were severe on cotton in CALIFORNIA, but were the lightest in several years in NEVADA where they were kept in check by parasites and predators.

Several lepidopterous pests infested cotton in CALIFORNIA. Late populations of COTTON LEAF PERFORATOR (Bucculatrix thurberiella) developed on cotton in desert areas and larvae of PINK SCAVENGER CATERPILLAR (Sathrobrota rileyi) were found in cotton bolls in several areas of the State. CELERY LEAF TIER (Udea rubigalis) and FALSE CELERY LEAF TIER (U. profundalis) caused some damage to cotton in a few locations. Larvae of a LEAF ROLLER MOTH (Platynota stultana) caused varying degrees of damage to cotton in California, and was more prevalent in northern areas of the State than previously observed. Some late infestations of SALT-MARSH CATERPILLAR (Estigmene acrea) also developed on cotton in California. Salt-marsh caterpillar was generally light on cotton in ARIZONA, but some heavy infestations did develop in Pima, Pinal, and Yuma Counties.

CABBAGE LOOPER (Trichoplusia ni) was a general pest of cotton in all areas of CALIFORNIA. Some chemical controls were necessary in NEVADA, but parasites and predators controlled most cabbage looper infestations in the State. Cabbage looper infestations were moderate in OKLAHOMA and cotton in the central and southwest sections of the State was damaged during the summer. Cabbage looper and a FALSE CABBAGE LOOPER (Pseudoplusia includens) appeared on cotton as early as June in ALABAMA but caused no damage until August. Unspecified LOOPERS ranged light to moderate on cotton in GEORGIA, but infestations were controlled by disease before reaching damaging proportions.

BEET ARMYWORM (Spodoptera exigua) damaged seedling cotton during May and June in ARIZONA, but was not a serious problem during late summer. Beet armyworm also damaged seedlings in many areas of CALIFORNIA, and required some controls in NEVADA. Most infestations in Nevada were controlled by parasites and predators. EUROPEAN CORN BORER (Ostrinia nubilalis) larvae were common in stalks and bolls of cotton late in the season in MISSOURI.

A PLANT BUG complex composed of COTTON FLEAHOPPER (Psallus seriatus), TARNISHED PLANT BUG (Lygus lineolaris), RAPID PLANT BUG (Adelphocoris rapidus), and Neurocolpus nubilus infested as much as 92 percent of cotton fields in MISSOURI. Although infestations were above the recommended level for treatment, no controls were applied. Cotton fleahopper became active during mid-June in OKLAHOMA, with moderate to heavy populations common in cotton during the summer. LYGUS BUGS (Lygus spp.) were medium to heavy in ARIZONA from June through September, but were normal in CALIFORNIA where controls were restricted to possible outbreaks of other cotton pests. Lygus bugs began increasing on cotton during mid-June in NEVADA, and by June 10 required controls through the remainder of the season in Clark and Nye Counties. CONCHUELA (Chlorochroa ligata) and other STINK BUGS were severe on cotton during the early summer months in most southern counties of NEW MEXICO, where damage to young squares and bolls was very noticeable. SAY STINK BUG (C. sayi) caused light to moderate damage to cotton bolls in many areas of ARIZONA during July and August, and several species of stink bugs were a problem on cotton late in the season in Imperial County, CALIFORNIA. Also in California, LEAFHOPPERS infested cotton early in the season and caused some loss to the crop in all cotton-growing areas of the State.

APHIDS developed late on cotton in CALIFORNIA but caused little damage. Populations of COTTON APHID (Aphis gossypii) were heavier than normal and damaged cotton in Maricopa and Pinal Counties, ARIZONA, during April and May, with the greatest amount of damage occurring in Queen Creek and Chandler areas. COWPEA APHID (Aphis craccivora) occurred in economic numbers on cotton in the Pecos and Mesilla Valleys of NEW MEXICO for the first time in 6 years. Several fields were treated in these areas. Cotton aphid was noneconomic in OKLAHOMA. Isolated infestations occurred on cotton in MISSOURI, but a late season buildup was eliminated by an early freeze. Cotton aphid was heavier early in the summer in ARKANSAS than in previous years, probably due to cool weather. Early cotton aphid populations of 1-25 aphids per cotton plant were present throughout ALABAMA, but large numbers of convergent lady beetle (Hippodamia convergens) reduced these infestations. Unspecified APHIDS were light on cotton early in the season in GEORGIA, with some buildup occurring before control measures were used.

THRIPS ranged light to heavy on cotton throughout GEORGIA early in the season. Cold, wet weather in the spring slowed cotton development resulting in more severe damage. TOBACCO THRIPS (Frankliniella fusca) and FLOWER THRIPS (F. tritici) infested cotton statewide in ALABAMA, especially plants in the 2 to 6-leaf stages. Unspecified thrips were heavier during early summer in ARKANSAS than during many years, with approximately 20 percent of cotton being treated. Tobacco thrips, flower thrips, and Sericothrips variabilis were very heavy on cotton in MISSOURI due to late planting. The cotton acreage treated in Missouri during 1966 was approximately twice that treated any previous year. Heavy populations of thrips damaged cotton in many areas of OKLAHOMA during the summer. WESTERN FLOWER THRIPS (Frankliniella occidentalis) populations were higher than normal on cotton during the spring in ARIZONA and caused concern to cotton growers throughout the State. Various species of thrips were a seasonal problem on cotton in CALIFORNIA.

PACIFIC SPIDER MITE (Tetranychus pacificus) and TWO-SPOTTED SPIDER MITE (T. urticae) were common in all cotton-growing areas of CALIFORNIA, with some controls applied. Unspecified SPIDER MITES were a problem on cotton in NEVADA early in the season, with controls necessary until early June. Infestations were heaviest on cotton adjacent to alfalfa in Nevada. Spider mites were noneconomic in OKLAHOMA. STRAWBERRY SPIDER MITE (T. atlanticus) was the principal spider mite that infested 25 percent of cotton fields in MISSOURI during late July. Spot and strip treatments were effective in controlling these pests. Probably due to dry weather in ARKANSAS, spider mites were heavier during June than in 1965. For the remainder of 1966, however, populations were lighter than usual. Infestations were confined to extreme northern ALABAMA. Severe in some areas of Georgia, spider mites required control.

TOBACCO

Highlights:

CABBAGE LOOPER and Heliothis spp. were more abundant than normal and caused economic damage to flue-cured tobacco in Florida. TOBACCO FLEA BEETLE was medium to heavy in Maryland, but light in Virginia and Florida. GREEN PEACH APHID was observed in more fields than any time since 1946 in Florida, and was the major tobacco pest in Maryland.

CABBAGE LOOPER (Trichoplusia ni) was much more abundant than normal in FLORIDA, and caused considerable economic damage to flue-cured tobacco. Cabbage looper prevailed throughout the flue-cured district but was especially noticeable in Madison, Suwannee, and Lafayette Counties. In Gadsden County, infestations were similar to 1965 and caused moderate to heavy damage to cigar-wrapper tobacco. TOBACCO BUDWORM (Heliothis virescens) damaged some late beds of tobacco in Gadsden County; some fields had 25 percent of plants damaged 2 weeks after transplanting. POTATO TUBERWORM (Phthorimaea operculella) infestations were moderate late in the season but heavier than in 1965 in Florida. BLACK CUTWORM (Agrotis ipsilon), GRANULATE CUTWORM (Feltia subterranea), and VARIEGATED CUTWORM (Peridroma saucia) moderately damaged young transplants in FLORIDA. CUTWORMS were generally light in the southern tobacco-growing area of VIRGINIA. Heliothis spp. were more numerous and damaging on flue-cured tobacco in Pittsylvania, Halifax, and Mecklenburg Counties in that State than in the past several years.

TOBACCO FLEA BEETLE (Epitrix hirtipennis) adults were medium to heavy on tobacco in MARYLAND. Numbers on late tobacco were heavy during August and September. The overwintered tobacco flea beetle populations ranged light to medium on newly-transplanted tobacco in southern VIRGINIA. The second generation emerged later than normal, but infestations were generally moderate. A few heavy, localized infestations were reported in Pittsylvania and Mecklenburg Counties. Tobacco flea beetle losses were light in FLORIDA; insecticide applications were effective on tobacco beds and in fields. WIREWORMS, predominantly TOBACCO WIREWORM (Conoderus vespertinus), caused very light damage in most tobacco fields in southern VIRGINIA. However, heavy damage occurred in an occasional field in Pittsylvania and Halifax Counties, with losses up to 80 percent in one field. SOUTHERN POTATO WIREWORM (C. falli) was the dominant species on tobacco in FLORIDA; populations were light on field tobacco with insecticide control. VEGETABLE WEEVIL (Listroderes costirostris obliquus) caused light damage to tobacco in plant beds in Florida.

GREEN PEACH APHID (Myzus persicae) was reported from more fields than at any time since 1946 in FLORIDA. Infestations were probably due to poor control treatments. Damage was confined to small areas in fields and was light where cleanup treatments were applied. Green peach aphid remained at noneconomic levels in Pittsylvania County, VIRGINIA, where drought and high temperatures prevalied during June and July; however, infestations were occasionally heavy on irrigated tobacco and were medium in Mecklenburg County. Populations were normal in MARYLAND with several thousand acres treated during August. Green peach aphid was the major tobacco pest during 1966 in the State. SUCKFLY (Cyrtopeltis notatus) was light on some late-maturing tobacco in VIRGINIA.

SUGARBEETS

Highlights:

CUTWORMS were a major problem on sugarbeets in Colorado, Nevada, and Washington. BEET ARMYWORM was heavy on sugarbeets in Nevada and caused damage in California. SUGAR-BEET ROOT MAGGOT populations were high in Colorado and Wyoming.

BEET WEBWORM (Loxostege sticticalis) was extremely low throughout MINNESOTA; in NORTH DAKOTA heaviest populations occurred in the northern Red River Valley and caused localized damage in some fields. Generally, infestations were noneconomic. Beet webworm damaged some sugarbeets in southwest NEBRASKA during July. Populations remained low in KANSAS during summer and caused no problems. One generation occurred on sugarbeets in Larimer and Weld Counties, COLORADO, with controls required in some fields. Populations were moderate in the eastern area.

Migrating populations of SALT-MARSH CATERPILLAR (Estigmene acrea) caused considerable damage to seedling sugarbeets in Maricopa and Pinal Counties, ARIZONA, during October and November. CUTWORMS were a major problem on sugarbeets in the Western Slope area of COLORADO. BLACK CUTWORM (Agrotis ipsilon) was heavy on sugarbeets in Churchill and Pershing Counties, NEVADA, during early summer and required controls. RED-BACKED CUTWORM (Euxoa ochrogaster) and other cutworms damaged sugarbeets in the Yakima Valley and the Columbia Basin of WASHINGTON, early in the season. BEET ARMYWORM (Spodoptera exigua) was light to moderate on sugarbeets during September and October in Maricopa and Pinal Counties, ARIZONA. Beet armyworm was heavy on sugarbeets during summer in Churchill and Pershing Counties, NEVADA, and caused considerable damage to sugarbeets in CALIFORNIA. SUGAR-BEET CROWN BORER (Hulstia undulatella) damaged sugarbeets in Los Angeles County, California.

A WEEVIL (Cosmobaris americana) was collected from sugarbeet foliage in Malheur County, OREGON, in August 1965 for first record. Scattered infestations occurred on sugarbeets in Malheur County this season. SUGAR-BEET WIREWORM (Limonius californicus) was the dominant wireworm species found on irrigated lands in IDAHO. Infestations are expected to spread and damage to increase until satisfactory control is found. The present organophosphorus insecticides have not given satisfactory protection from wireworms. Sugar-beet wireworm damaged sugarbeets in Yakima County, WASHINGTON, early in the season. GREAT BASIN WIREWORM (Ctenicera pruinina) damaged sugarbeets in Yakima and Franklin Counties, Washington. Undetermined WIREWORMS damaged sugarbeets near Kindred, NORTH DAKOTA. Larvae of unspecified FLEA BEETLES caused some losses to sugarbeets in Larimer and Weld Counties, COLORADO. Flea Beetles were observed on sugarbeets at Presque Isle, MAINE, in mid-June.

SAY STINK BUG (Chlorochroa sayi) and GREEN STINK BUG (Acrosternum hilare) caused stunting of sugarbeet plants in the Arkansas Valley of COLORADO; control was not satisfactory. A STINK BUG (Thyanta punctiventris) caused light damage to sugarbeets in southwest KANSAS in June and July; many fields were treated. LYGUS BUGS (Lygus spp.) in destructive numbers infested sugarbeets in MONTANA. Lygus bugs were more damaging than usual to sugarbeets early in the season in the Yakima Valley, WASHINGTON. BEAN APHID (Aphis fabae) was unusually abundant and damaging to sugarbeets in the Yakima Valley and the Columbia Basin of Washington. GREEN PEACH APHID (Myzus persicae) required control in sugarbeets and lettuce in Pinal and Maricopa Counties, ARIZONA, during fall. BEET LEAFHOPPER (Circulifer tenellus) caused considerable damage to sugarbeets in some locations in CALIFORNIA.

SUGAR-BEET ROOT MAGGOT (Tetanops myopaeformis) populations on sugarbeets were at high levels in Larimer and Weld Counties, COLORADO, and caused considerable reduction in yield. Populations were slightly larger than in 1965 in WYOMING; damage was first noted in the Big Horn Basin during late June and was severe in Washakie County with 3-5 plants damaged in 100. Infestations ranged 10-100 percent in Walsh and Pembina Counties, NORTH DAKOTA. LEAF MINER FLIES (Pegomya spp.) were evident in most sugarbeet fields in McKenzie County, North Dakota, and the Red River Valley. Some fields were 75 percent infested with blasted areas evident on up to 6 leaves per plant. Leaf miner flies were low in Red River Valley area of MINNESOTA, with no control required. A LEAF MINER FLY injured some sugarbeet foliage at Presque Isle, MAINE, during late July.

MISCELLANEOUS FIELD CROPS

Highlights:

CABBAGE LOOPER was observed on mint for the first time in recent years in Washington. A BILLBUG caused extensive damage to orchard grass plantings in Oregon. LYGUS BUGS damaged safflower in Arizona and flax in North Dakota. TWO-SPOTTED SPIDER MITE was severe on mint in Washington and was present earlier than normal in Oregon.

BANDED SUNFLOWER MOTH (Phalonia hospes) and SUNFLOWER MOTH (Homoeosoma electellum) infestations ranged 20-90 percent with 2-21 larvae per head in most sunflower fields in eastern NORTH DAKOTA. DIAMONDBACK MOTH (Plutella xylostella) larvae lightly damaged mustard in Ward County, and IMPORTED CABBAGEWORM (Pieris rapae) larvae were evident on mustard in Pembina County, North Dakota.

CABBAGE LOOPER (Trichoplusia ni) was observed on mint for the first time in central WASHINGTON since 1952 and in southeast area since 1958. RED-BACKED CUTWORM (Euxoa ochrogaster) and the other cutworms damaged mint and hops in the Yakima Valley and the Columbia Basin, WASHINGTON, early in the season. VARIEGATED CUTWORM (Peridroma saucia) caused less damage to many crops than in 1965 in OREGON. Heavy egg deposits were observed during summer, but economic damage was minor. Larvae were very light in mint fields. First-stage larvae of ALFALFA LOOPER (Autographa californica) were noneconomic on mint in the Willamette Valley, OREGON. A MINT FLEA BEETLE (Longitarsus waterhousei) was found for the first time in Jefferson County, Oregon; damaged one field. Adults began emerging in the Willamette Valley during early July but caused little damage due to good control. A BILLBUG (Sphenophorus venatus confluens) caused extensive damage to orchard grass grown for seed in Benton, Linn, and Lane Counties, OREGON.

A MINT APHID (Ovatus crataegarius) was unusually abundant during a relatively cool season in WASHINGTON; required control on peppermint and spearmint during early August. HOP APHID (Phorodon humuli) was abundant on hops in the Yakima Valley of Washington. Heavy honeydew resulted in mold development and defoliation in unsprayed yards.

LYGUS BUGS (Lygus spp.) caused extensive injury to seedling safflower in Maricopa and Pinal Counties, ARIZONA; populations remained high until crop maturity. Migration from safflower to cotton was heavy and of concern to cotton growers. TARNISHED PLANT BUG (Lygus lineolaris) was moderate in flax in Grand Forks County, NORTH DAKOTA.

Trace numbers of SUNFLOWER MAGGOT (Strauzia longipennis) were evident on sunflowers in Cass County, NORTH DAKOTA.

TWO-SPOTTED SPIDER MITE (Tetranychus urticae) was severe on mint in the Columbia Basin, WASHINGTON, but less abundant than normal on hops in the Yakima Valley, with populations developing a month later than in 1965. In OREGON, infestations were present on hops 6 weeks earlier than normal in Marion, Benton, and Josephine Counties.

Weather continued from page 172.

TEMPERATURE: Unusually cold early in the week, with freezing temperatures in all of the Continental United States, and subzero temperatures as far south as the central Great Plains. This was followed, at midweek, by unusual warmth over the middle and southern States, which spread to the East over the weekend. The temperature at Dodge City, Kansas, "high-jumped" from -1° on Wednesday morning to 71° on Thursday afternoon. Warm temperatures continued over the Central States and East for the rest of the week with the southern three-quarters of the Nation averaging 1° to 7° above normal. Arctic outbreaks early in the week and on Friday kept temperature averages below normal along the northern border from the Pacific Ocean to northern New England. (Summary supplied by Environmental Data service, ESSA.)

Notes on, and a Key to, the Species of *Neophyllaphis* Takahashi

(Homoptera: Aphididae)

Louise M. Russell 1/

Five species have been described in the genus *Neophyllaphis* Takahashi, and another, *Chileaphis michelbacheri* Essig (p. 65), has been transferred to *Neophyllaphis* by Russell (p. 340). *Mindarus podocarpi* Shinji (p. 532) was synonymized with *N. podocarpi* Takahashi by Takahashi (1924 p. 112). Of the six species now recognized in *Neophyllaphis*, one occurs in Hawaii and two are present in the continental United States. *N. araucariae* Takahashi was described in 1937 (pp. 105-106). Though unrecognized at the time, it was found in Hawaii by Timberlake (p. 267) in 1917. It was next recorded, as *araucariae*, by Krauss (p. 17) as having been collected in 1943. Subsequently it has been reported from new locations in the State by Swezey (p. 470), Beardsley (p. 26), and Shiroma (pp. 29-30). This species was first found in Florida in 1963 according to Woodruff (p. 131), and Cooperative Economic Insect Report (1963 p. 1334), and was rediscovered in 1966 when it was reported in CEIR (1966 p. 390) as having been found in three localities. *N. podocarpi* was found in California in 1954, 1957, 1958, and 1964, according to Hawthorne, and Harper (p. 82) indicated that the species had gradually extended its range in the State. *N. podocarpi* was found in Louisiana in the spring of 1966 and its presence was reported in CEIR (1966 p. 500) in November.

Neophyllaphis araucariae and *N. podocarpi* are becoming of increasing interest in the United States, and they, or related species, presumably will be intercepted at our ports of entry. For these reasons, and because it is difficult to recognize the species of *Neophyllaphis* from the existing, scattered literature, it seems desirable to devise keys to the various species and forms, insofar as this is possible, and to assemble miscellaneous information concerning the insects.

Economic Importance - *Neophyllaphis podocarpi*, *N. grobleri* Eastop, and *N. araucariae* are known to be of economic importance. Takahashi (1921 p. 78, 1923 pp. 129-130) stated that *podocarpi* was very common, that it sometimes grouped densely, and attacked the lower surface of leaves, particularly the young ones, causing them to curl. Boudreaux, and CEIR (1966 p. 500) indicated that in Louisiana heavy populations of the aphid reduced the growth of the infested *Podocarpus*. The plants also became covered with sooty mold that grew in the honeydew excreted by the insects. In CEIR (1966 p. 1047) *N. podocarpi* was said to be "heavy on podocarpus nursery stock in Mill Valley, Marin County," California. Eastop (1955 p. 160, 1958 p. 86) stated that *N. grobleri* feeds on both seedlings and full grown trees. He (1961 p. 59) stated further that "*grobleri* may be a pest.....in nurseries as heavy attacks stunt and distort the growing points and the wax covered aphid is difficult to wet with insecticide." Although Timberlake (p. 267) wrote that he found the aphid that was later identified as *N. araucariae* "abundant on young shoots of *Araucaria*," most subsequent reports of this species in Hawaii and Florida indicate that the insect occurs sparsely. However, Hu (p. 967) stated that *araucariae* infested "40 acres of Norfolk Island pine trees in Kapoho, Hawaii Island. Wingless forms on heavily infested trees ranged 10-20 per leaf. Winged forms in lesser numbers." Cottier (p. 317) wrote that *N. totarae* Cottier infested its host sparsely, usually being found singly on leaves or in small groups on young trees, and that it was not of economic importance. Carver (p. 26) reported *gingerensis* Carver as being found singly or in small groups on the leaves, "being mostly confined to the purple coloured shoots, where it is well camouflaged." Essig (pp. 65-66) made no statement concerning the location, abundance, or injuriousness of *michelbacheri*, but from the number of individuals listed, a total of 124, it seems likely that the species occurred in fair numbers. He stated that the aphids were collected by beating the limbs and foliage of the host plant.

1/ Entomology Research Division, ARS, U. S. Department of Agriculture, Washington, D. C. 20250.

Predators - Species of *Neophyllaphis* apparently have few insect enemies. Mamet (p. 56) stated that in Mauritius *araucariae* was attacked by the coccinellid beetle *Exochomus laeviusculus* Weise, and by an entomogenous fungus, *Cephalosporium aphidicola* Petch. Zimmerman (p. 66) listed one coccinellid, *Coelophora inaequalis* (Fabricius), and one chrysopid, *Chrysopa lanata* Banks, as predators of *araucariae* in Hawaii. Eastop (1958 p. 86) wrote that *grobleri* "which is wax covered in life, is often preyed upon by wax-covered coccinellid larvae." I have found no records of attacks by parasites on members of this genus.

Hosts and distribution - Species of *Neophyllaphis* are known on two genera of the Pinaceae and one genus of the Taxaceae (sensus latus). They occur on five continents and several islands. Records are as follows:

Araucaria cunninghami, *A. excelsa*, *Araucaria* sp.
N. araucariae - Florida, Hawaii; Mauritius; Australia (New South Wales, Queensland, Eastop 1966 p. 516).

Pilgerodendron uviferum (*uviferum* also has been placed in *Juniperus*, *Libocedrus*, and *Thuja*, Essig p. 65).
N. michelbacheri - Chile (Llanquihue).

Podocarpus alpina, *P. chinensis*, *P. elata*, *P. gracilior*, *P. henkelii*, *P. macrophylla*, *P. milanjianus*, *P. nageia*, *P. totara*, *Podocarpus* spp.
N. gingerensis - Australia (Mt. Gingera, Mt. Ginini).
N. grobleri - Kenya; South Cameroons; South Africa; Tanganyika; Transvaal.
N. podocarpi - California, Louisiana; Australia (Sydney, Hardy p. 31; Queensland, Eastop 1966 p. 517); China (Chekiang, Fukien, Kwangtung, Szechuan), Taiwan, Japan, Ryukyu Islands, (Tao p. 210); Malaya (Takahashi 1950 p. 587); Botel Tobago (Takahashi 1927 p. 17); Loochoo Islands (Takahashi 1930 p. 325).
N. totarae - New Zealand.

N. grobleri and *N. totarae* were at first misidentified as *podocarpi*. Thus, reports of *podocarpi* from Africa and New Zealand are erroneous.

Relationships - The placement of *Neophyllaphis* within the Aphididae (sensus latus) has varied, but most frequently has been in the Callipterinae or Callipterini. It was placed either in this subfamily or tribe by Takahashi (1921 p. 69), though originally he (1920 pp. 19-20) did not assign it to a supergeneric group, by Baker (p. 23), Boerner (p. 128), Eastop (1958 p. 86, 1961 p. 59), and Tao (p. 210). Recently Eastop (1966 p. 514) placed *Neophyllaphis* in the Drepanosiphinae, listing the Phyllaphidinae and Callipterinae as synonyms. Essig (p. 65) placed *Chileaphis* in the Callaphidinae. However, Boerner (pp. 165, 177) and Cottier (p. 76) assigned *Neophyllaphis* to the Thelaxini. Although Eastop (1961 pp. 59-60) placed the genus in the Callipterinae, he stated: "The often alate oviparae, indistinctly separated head and pronotum of the apterae and nymphs and their three-faceted eyes, the annular rhinaria of the alatae, absence of flattened empodial haris from the tarsi and short processus terminalis may indicate that *Neophyllaphis* belongs in the Thelaxinae, distantly related to *Mindarus* Koch."

Neophyllaphis was placed in the subtribe Phyllaphidina by Baker (p. 23), in Callipterina by Boerner (p. 128), and in "Subtribe Neophyllaphidini" by Takahashi (1921 pp. 69, 76). Takahashi (1931 p. 79) elevated his subtribe to tribal rank, and thereafter most workers except Cottier followed this placement. Quednau (1962 p. 248) established the subfamily Neophyllaphidinae without other characterization than the inclusion of the species *N. grobleri* Eastop. Richards (1966 p. 758), apparently unaware of Quednau's action, and also without characterizing the subfamily, stated, "Neophyllaphidinae new status."

Neophyllaphis is an old group. Mordvilko (p. 270) suggested that it might be "almost of the same antiquity as Podocarpus."

Distinguishing Characters - *Neophyllaphis* is unusual in several respects. The oviparous females of *grobleri*, *michelbacheri*, *podocarpi*, and *totarae* are winged, whereas those of *gingerensis* are wingless, as are those of most aphids. The sexuales of *grobleri*, *michelbacheri*, and *podocarpi* appear in the spring, summer, and fall, and those of *gingerensis* and *totarae* in the spring. Sexuales of most aphid species appear only in the fall. The winged viviparae of *grobleri*, *gingerensis*, and *podocarpi* may have a few pseudosensoria on the hind tibiae. This also is uncommon, these structures usually being present only in oviparae. In *gingerensis*, *grobleri*, *michelbacheri*, *podocarpi*, and *totarae*, the only species in which the oviparae have been described, the cauda is strikingly dissimilar in shape to that of the other forms. Such a variation in the shape of the cauda is extremely rare.

Neophyllaphis is distinguished from other genera known in the United States by the following combination of characters: Secondary sensoria absent from antennal segment III in all apterae, annular or semiannular in alate viviparae, annular or semiannular to oval in alate sexuales; base of antennal segment VI much longer than the unguis; eyes of apterae with 3 facets; ocular tubercles strongly tuberculate in alatae; last rostral segment without setae except for the 3 apical pairs; cornicles porelike and slightly to distinctly elevated; each first tarsal segment with 5-9 (most often 7) setae; anal plate slightly to distinctly bilobed; cauda constricted in viviparae and males, with distal portion globose or elongate; cauda in oviparae greatly enlarged, modified in shape and subquadrate or platelike; oviparae apterous or alate.

The keys and data presented here have been extracted from literature and observed in specimens determined as *araucariae*, *grobleri*, *michelbacheri*, and *podocarpi*. Examples of *gingerensis* Carver and *totarae* Cottier have not been studied by me.

Most of the characters given in the key are apparent only in slide-mounted specimens. The descriptions of some species, or forms, do not mention all structures that might be useful in the separation of species. For this reason, certain characteristics are sometimes included in one part of a couplet to assist the identifier, even though they are necessarily omitted from the other part.

Key to alate viviparae

Alate viviparae of *michelbacheri* are unknown.

1. Antenna 5 or 6-segmented; antennal segment III with 20-24 secondary sensoria distributed over its entire length and encircling the ventral 3/5 of its circumference, the dorsal 2/5 imbricated; segments III-V (or VI) approximately 113 mm long; cauda elongate.....................................*araucariae* Takahashi

   Antenna 6-segmented; combination of other characters not as in *araucariae*...2

2. Cauda globular, with about 12 setae; antennal segment III with 50-80 secondary sensoria encircling the ventral 3/4 of its circumference, the dorsal 1/4 not imbricated; each, or anterior 6, abdominal terga with a black, transverse bar; 8th tergum with 6-8 setae; base of cornicle with 2 setae...*grobleri* Eastop

   Cauda elongate, with 5 setae; antennal segment III with fewer than 50 secondary sensoria, encircling the ventral 3/4 of its circumference or not, but the dorsal 1/4 imbricated in *podocarpi* and *totarae* (condition unknown in *gingerensis*); each abdominal tergum without a black, transverse bar; 8th tergum with 4 setae in *podocarpi* (number unknown in *gingerensis* and *totarae*); base of cornicle without setae in *podocarpi* and presumably without setae in *gingerensis* and *totarae*..3

3. Antennal segment III with 32-45 annular secondary sensoria distributed over its entire length and encircling the ventral 2/3 of its circumference..podocarpi Takahashi

Antennal segment III with fewer than 30 secondary sensoria, all not annular, and some elongate oval or narrowly oval if distributed over entire length of segment, all not encircling the ventral 2/3 circumference of segment.......4

4. Antennal segment III with 20-25 secondary sensoria distributed over its entire length; III approximately 7/8 length of combined segments IV-VI; IV usually with 1 or 2 secondary sensoria; abdomen with inconspicuous scleroites at bases of dorsal setae.................................gingerensis Carver

Antennal segment III with 10-22 secondary sensoria, absent from ends of segment; III approximately 3/5 length of combined segments IV-VI; IV without secondary sensoria; abdomen without scleroites at bases of dorsal setae...totarae Cottier

Key to apterous viviparae

1. Antenna 5-segmented; living insects yellow; not pulverulent or waxy..araucariae Takahashi

Antenna 6-segmented; color of living insects of grobleri and michelbacheri unknown, other species purplish blue, or reddish brown to reddish purple; pulverulent or waxy...2

2. Cauda globular, with 12 or more setae; waxy..............................3

Cauda elongate, with 5 or 6 setae; pulverulent..........................4

3. Cornicles slightly dusky, weak, the base only slightly larger than the opening and with 1 or 2 setae; subanal plate slightly bilobed; cauda with about 12 setae..grobleri Eastop

Cornicles darker, almost truncate, the diameter of the base about twice that of the opening and with 5-7 setae; subanal plate deeply cleft into 2 lobes; cauda with about 30 setae..............................michelbacheri (Essig)

4. Subanal plate indented but not divided into 2 seperate, distinct lobes; abdominal terga apparently (not mentioned in description) without dark scleroites around setal bases; antennal segment III slightly shorter than combined lenght of IV + V...totarae Cottier

Subanal plate distincly divided into 2 separate, distinct lobes; abdominal terga with dark, though inconspicuous scleroites around setal bases; antennal segment III approximately as long as combined length of IV + V............5

5. Head with 2 pairs of 2-5 cellular, glandlike areas, prothorax with 1 multicellular, glandlike area..................................gingerensis Carver

Head and prothorax without cellular, glandlike areas...podocarpi Takahashi

Key to oviparae

Oviparae of *araucariae* are unknown.

1. Wingless; antennal segment III without secondary sensoria; head with 2 pairs of cellular, glandlike areas, prothorax with 1 multicellular, glandlike area; cauda with apical portion ornamented with wax pore, glandlike areas.......... ....*gingerensis* Carver

   Winged; antennal segment III with secondary sensoria; head and prothorax without cellular, glandlike areas; cauda with apical portion not ornamented with wax pore, glandlike areas..........2

2. Fore, middle, and hind tibiae each with pseudosensoria.......... ....*michelbacheri* (Essig)

   Fore and middle tibiae without pseudosensoria..........3

3. Antennal segment III with 10-19 semiannular or oval secondary sensoria distributed over the proximal 2/3 - 3/4 of its length; cauda strongly constricted at base, ornamented with teardrop shaped designs.........*totarae* Cottier

   Antennal segment III with at least 20 annular secondary sensoria distributed over its entire length; cauda not constricted, ornamented with scroll-like lines..........4

4. Antennal segment III with 20-35 secondary sensoria; subanal plate strongly bilobed, with elongate slender setae as long as greatest width of hind tibia; cauda ornamented by lines running lengthwise of the structure.......... ....*podocarpi* Takahashi

   Antennal segment III with approximately 80 secondary sensoria; subanal plate weakly bilobed, with short, stout, spinelike setae, no longer than the least width of the hind tibia, and with an occasional elongate slender seta; cauda ornamented by scroll-like lines running in concentric circles.......... ....*grobleri* Eastop

Key to males

Males of *araucariae* and *grobleri* are unknown.

1. Subanal plate more or less entire; antennal segment III with 41-45 semiannular to oval secondary sensoria, the semiannular ones on the proximal half, most of the others on the distal half, of the segment; base of antennal segment VI with 0-2 secondary sensoria..........*totarae* Cottier

   Subanal plate divided into 2 distinct lobes; antennal segment III with about 40 (*michelbacheri*), or at least 50 semiannular to oval secondary sensoria arranged as in *totarae* in *michelbacheri* but not in other species; base of antennal segment VI with 5-7 secondary sensoria..........2

2. Subanal plate divided nearly to base, each lobe wider than long; antennal segment III with at least 100 secondary sensoria.........*podocarpi* Takahashi

   Subanal plate completely divided, each lobe presumably as long as wide; antennal segment III with about 40, or with 57-66, secondary sensoria........3

3. Antennal segment III with about 40 secondary sensoria; cornicle almost truncate and with 5-7 setae; abdominal terga 3-6 each with a dark transverse bar..michelbacheri (Essig)

Antennal segment III with 57-66 secondary sensoria; cornicle slightly elevated and presumably without, or with 1 or 2, setae; abdominal terga without transverse bars; sometimes with faint, dark scleroites around bases of setae..gingerensis Carver

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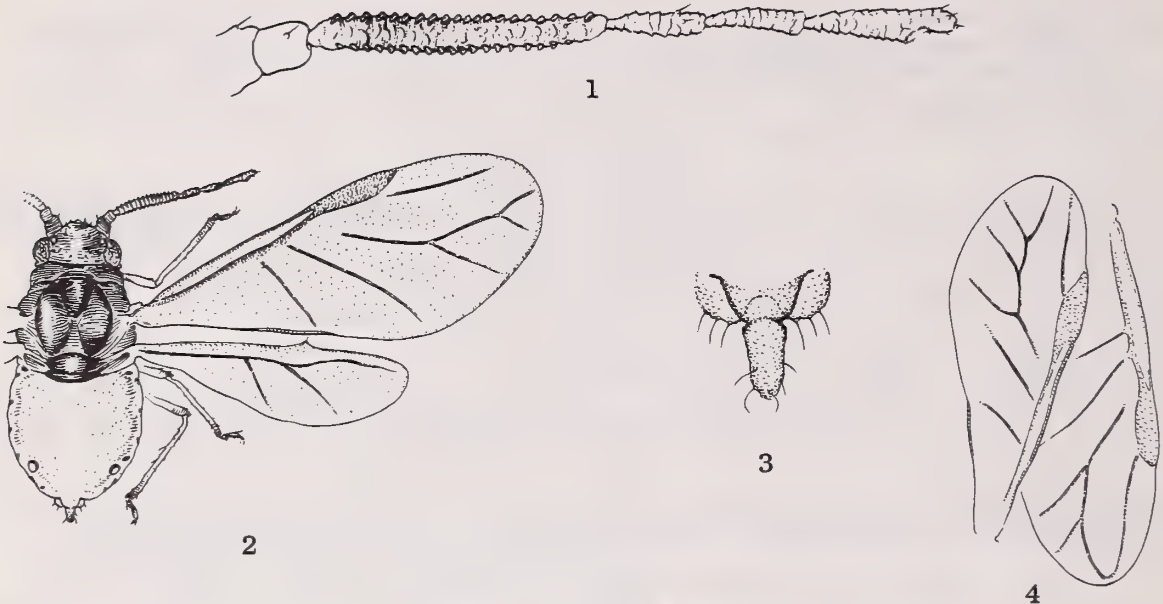
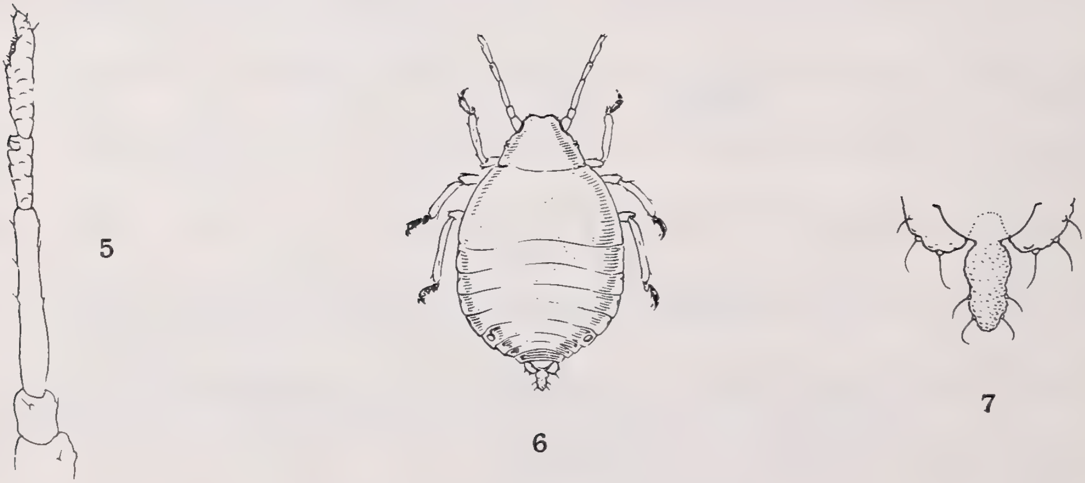
Neophyllaphis araucariae Takahashi



Alate Viviparous Female

1. Antenna 2. Adult 3. Cauda
4. Wings showing abnormal venation



Apterous Viviparous Female

5. Antenna 6. Adult 7. Cauda

Figures from Zimmerman,
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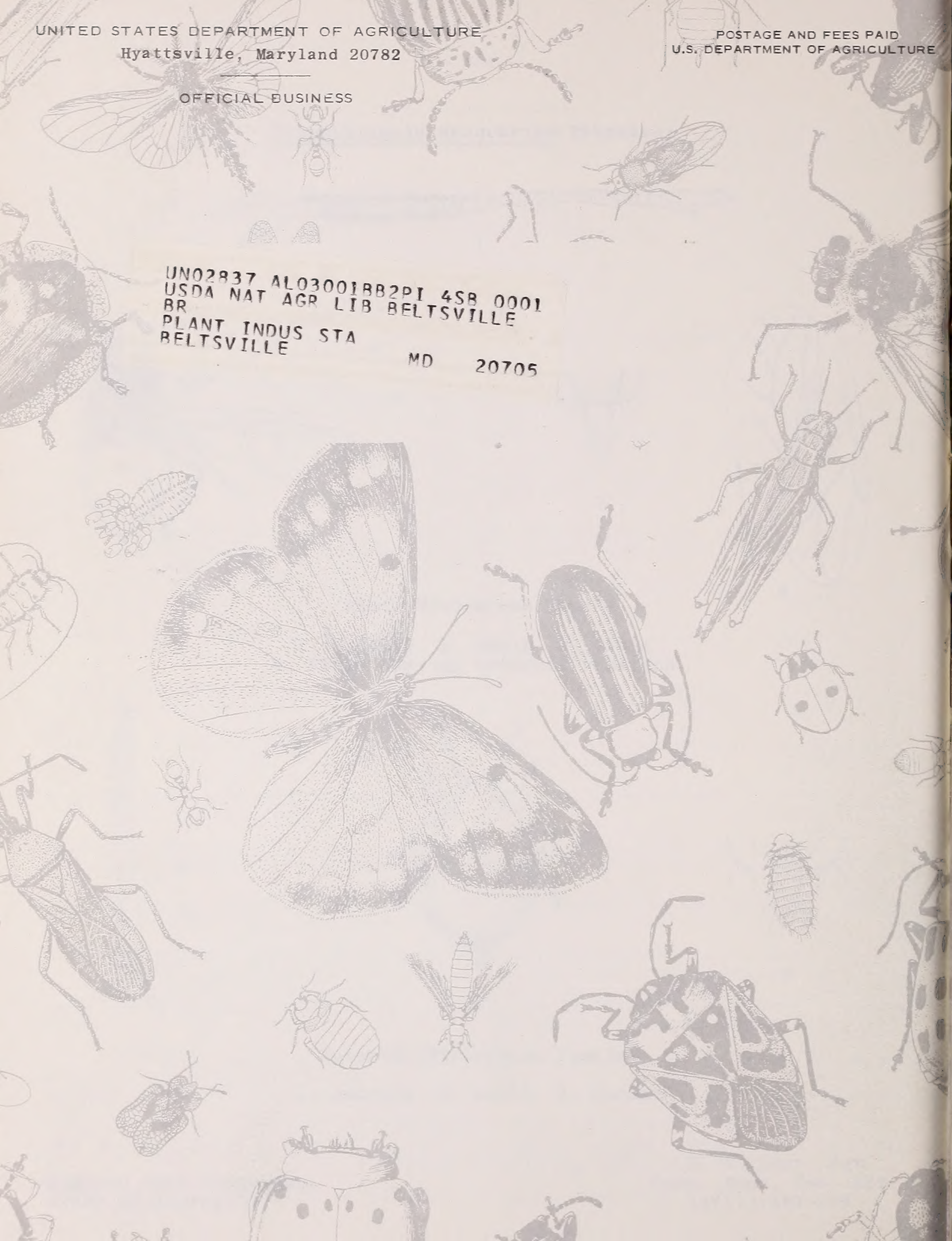

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